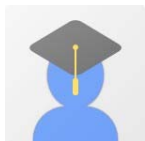


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Lidia Gurau

Processing roughness of sanded wood surfaces

Autori L Gurau, H Mansfield-Williams, M Irle

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Descriere Zusammenfassung Alle quantitativen Untersuchungen einer abgeschliffenen Oberfläche setzen voraus, dass die Daten gefiltert werden, um Formfehler und Schwankungen zu vermeiden. Holzoberflächen besitzen aufgrund des Schleifprozesses und ihrer Zusammensetzung Unregelmäßigkeiten; diese müssen bei jeder Messung der Oberfläche ausgeschlossen werden, damit der durch den Schleifprozess hervorgerufene Rauheitsgrad korrekt bestimmt werden kann. Die Wirksamkeit einer Reihe üblicher Filter wurde ...

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Articole Google [Processing roughness of sanded wood surfaces](#)
Academic L Gurau, H Mansfield-Williams, M Irle - Holz als Roh-und Werkstoff, 2005
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Machining properties and surface roughness of various wood species planed in different conditions

A Malkoçoğlu - *Building and Environment*, 2007 - Elsevier

This study was carried out to determine the planing properties and surface roughness of naturally grown Oriental beech (*Fagus orientalis* Lipsky.), Anatolian chestnut (*Castanea sativa* Mill), Black alder (*Alnus glutinosa* subsp. *Barbata* (CA Mey.) Yalt.), Scotch pine (...

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~~Filtering the roughness of a sanded wood surface~~

L Gurau, H Mansfield-Williams, M Irle - *Holz als Roh-und Werkstoff*, 2006 - Springer

Zusammenfassung Um Formfehler und Welligkeit zu vermeiden ist bei quantitativen Untersuchungen zur Rauheit von geschliffenen Oberflächen eine Filterung der Daten erforderlich. Die Grenzwellenlänge eines Rauheitsfilters legt fest, welche Wellenlängen ...

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Effect of sanding on surface roughness of rubberwood

O Sulaiman, R Hashim, K Subari, CK Liang - *Journal of Materials ...*, 2009 - Elsevier

The objective of this research was to study the effect of sanding on surface roughness of rubberwood. Surface roughness was measured using stylus profilometer. Sessile water drop technique was used to determine contact angle of the surface. The results indicated that ...

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Method for evaluating the influence of wood machining conditions on the objective characterization and subjective perception of a finished surface

CL Coelho, LMH Carvalho, JM Martins... - *Wood Science and ...*, 2008 - Springer

Abstract A method for evaluating the influence of the operating parameters of wood machining (planing, sanding) on the quality of a finished surface was established. The influence of each of the operations involved was studied using different strategies. For the ...

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Roughness models for sanded wood surfaces

PL Tan, S Sharif, I Sudin - *Wood Science and Technology*, 2012 - Springer

Abstract The understanding of the effects of variables is crucial to achieve the desired sanded surface quality at optimum condition. In wood surface evaluation, it is known that anatomies on wood surface could distort the roughness value and cause a ...

[Citat de 12 ori](#) [Articole cu conținut similar](#) [Toate cele 4 versiuni](#) [Citați](#) [Salvați](#)

Improving the sanding process of black spruce wood for surface quality and water-based coating adhesion

J Cool, RE Hernández - *Forest products journal*, 2011 - forestprodjournals.org

The sanding of black spruce wood prior to coating application was optimized for feed speed and grit size. As feed speed increased, the surface roughness and the surface energy of the samples increased. For the different sanding programs, reductions of the surface ...

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Optimal surface roughness for high-quality finish on Rubberwood (*Hevea brasiliensis*)

J Ratnasingam, F Scholz - *Holz als Roh-und Werkstoff*, 2006 - Springer

Zusammenfassung Um eine Bezugsgrösse für die optimale Oberflächenrauigkeit von Gummibaumholz (*Hevea brasiliensis*) zur Erzeugung hochwertiger Oberflächen festlegen zu können, wurden Versuche durchgeführt. Dabei wurden die Proben unter Verwendung ...

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Evaluation of four surfacing methods on black spruce wood in relation to poly (vinyl acetate) gluing performance

J Cool, RE Hernández - *Wood and Fiber Science*, 2011 - Soc Wood Sc Tech

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Evaluation of surface quality after profiled milling of alder and birch wood

[EA SALCA, A Fotin, I Cismaru - EVALUATION, 2008 - proligno.ro](#)

Abstract: The present paper presents a comparative study upon the quality evaluation of profiled surfaces obtained by milling, for alder and birch wood, as well as the influence of the processing regime upon the surface roughness. The samples were profiled milled on the ...

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Performance of three alternative surfacing processes on black spruce wood and their effects on water-based coating adhesion

[J Cool, RE Hernández - Wood and Fiber Science, 2011 - Soc Wood Sc Tech](#)

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Determination of the thermal conductivity of wood by the hot plate method: The influence of morphological properties of fir wood (*Abies alba* Mill.) to the contact ...

B Bučar, A Straže - *Holzforschung*, 2008 - degruyter.com

Abstract Thermal conductivity is frequently determined by the hot plate method. The influence of the anatomical and morphological properties of fir wood (*Abies alba* Mill.) was studied on the hot plate method and the mechanical treatment on the contact thermal ...

Citat de 5 ori Articole cu conținut similar Toate cele 2 versiuni Citați Salvați

Effect of wood finishing and planing on surface smoothness of finished wood

M Budakci, L Gurleyen, H Cinar... - *Journal of Applied ...*, 2007 - adsabs.harvard.edu

Abstract The effect of wood finishing and planing on surface smoothness of finished wood samples of Scots pine (*Pinus sylvestris* L.) eastern beech (*Fagus orientalis* L.) and oak (*Quercus petraea* L.), commonly used woods in the furniture industry in Turkey, was ...

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Effect of cutting width and cutting height on the surface quality of black spruce cants produced by a chipper-canter

RE Hernández, S Kuljich, A Koubaa - *Wood and Fiber Science*, 2010 - *Soc Wood Sc Tech*

Citat de 4 ori Articole cu conținut similar Toate cele 3 versiuni Citați Salvați

Surface characteristics of overlaid wood composites

S Hiziroglu, S Suzuki - *Journal of Tropical Forest Science*, 2009 - *JSTOR*

In this study, surface characteristics of commercially manufactured overlaid medium density fibreboard (MDF) and particleboard panels were evaluated. Roughness was measured randomly from the surface of overlaid samples conditioned at 55 and 93% relative ...

Citat de 3 ori Articole cu conținut similar Toate cele 3 versiuni Citați Salvați

Wood surface roughness-what is it?

S Jakub, N Martino - *Trees and timber research institute, Ivalsa/Cnr.(http:// ...)*, 2005

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~~Form error removal of sanded wood surfaces~~

L Gurau, H Mansfield-Williams, M Irle... - *European Journal of ...*, 2009 - *Springer*

Zusammenfassung Gemäß ISO 3274 können grobe Porenrillen ausgeschaltet werden, indem eine Polynomfunktion an die Rohdaten, das so genannte Gesamtprofil, angepasst wird, um das Primärprofil zu erhalten. Es hat sich gezeigt, dass bei Holzoberflächen die ...

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~~The influence of wood anatomy on evaluating the roughness of sanded solid wood~~

L Gurau, H Mansfield-Williams... - *Journal of the Institute of ...*, 2005 - maneyonline.com

Abstract Sanded wood surfaces contain irregularities caused by both the sanding process and the anatomy, so the anatomical roughness, which is independent of any machining operation, must be excluded from measurements of surface irregularities if the processing ...

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INFLUENCE OF THE VARIABLE PARAMETERS OF THE MACHINING REGIMES UPON THE SURFACE QUALITY OBTAINED BY STRAIGHT MILLING.

A FOTIN, I CISMARU, EA SALCĂ, M CISMARU - *Pro Ligno*, 2009

Citat de 2 ori Articole cu conținut similar Citați Salvați

~~An objective method to measure and evaluate the quality of sanded wood surfaces~~

L Gurau - *The Final Conference Of Cost Action*, 2010 - coste53.net

Abstract No agreed guidelines exist in wood surface metrology about how to objectively measure and evaluate the surface quality and existing general standard methods and corresponding software are not usually applicable to wood. This paper presents a review ...

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Influence de l'usinage du bois sur les caractéristiques objectives et sur la perception subjective de l'aspect d'une finition

C Coelho - 2006 - theses.fr

Résumé L'influence des paramètres d'usinage du bois sur la qualité de la surface finie a été étudiée. Les paramètres étudiés concernent les opérations d'usinage, de préparation de la surface et d'application des produits. Un plan d'expériences de Taguchi a été utilisé. La ...

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The effect of the process parameters in the planing processes on the surface roughness of cherry and pear woods

[C Sogutlu, A Togay - African Journal of Biotechnology, 2013 - ajol.info](#)

Abstract In this study, the effects of the process parameters in the planing processes on the surface roughness were investigated. For this purpose, the experimental samples of cherry (*Prunus avium* L.) and pear (*Pirus communis* L.) wood species, which are commonly used ...

[Citat de 2 ori](#) [Articole cu conținut similar](#) [Citați](#) [Salvați](#)

The effect of the feeding direction and feeding speed of planing on the surface roughness of oriental beech and scotch pine woods

[C Sogutlu - Wood Research, 2010 - woodresearch.sk](#)

ABSTRACT The objective of this study is to determine the effect of the feeding direction and feeding speed of planing on the surface roughness of the Oriental beech (*Fagus orientalis* L.) and Scotch pine (*Pinus silvestris* L.) wood species grown in the Black Sea Region of ...

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Study concerning the influence of milling parameters upon the surface quality

[A FOTIN, I CISMARU, M CISMARU, E SALCĂ - Pro Ligno, 2010 - proligno.ro](#)

Abstract: This paper presents a comparative study concerning the surface quality resulted after processing birch wood in longitudinal and transverse direction by means of two cutters with removable plates from sintered metal carbide, with different diameters: D80 mm, ...

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Estudo dos Efeitos dos Parâmetros de Maquinação da Madeira nas Características Objectivas e Percepção Subjectiva de um Acabamento

[CM Coelho, L Carvalho, J Martins, C Costa... - 5º Congresso Florestal ..., 2005 - esac.pt](#)

Resumo. Neste artigo apresenta-se o estudo dos efeitos dos parâmetros de maquinação da madeira nas características objectivas e percepção subjectiva de um acabamento. Esta tarefa é parte de um estudo cujo objectivo é, fornecer a informação necessária para uma ...

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ANALIZA RUGOZITĂȚII SUPRAFEȚEI LEMNULUI DE ARIN NEGRU ÎN FUNCȚIE DE DIFERII PARAMETRI DE PRELUCRARE

[EA SALCĂ, S HIZIROGLU - researchgate.net](#)

Abstract: The objective of this study was to analyse the surface quality of black alder (*Alnus glutinosa*) samples as function of sanding processes based on four grits sizes, namely 60, 80, 100 and 120. The sanding process was performed parallel, perpendicular and at 45 ...

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Effects of peripheral planing on surface characteristics and adhesion of a waterborne acrylic coating to black spruce wood

[J Cool, RE Hernández - Forest Products Journal, 2012 - forestprodjournals.org](#)

Abstract Peripheral planing of black spruce (*Picea mariana*) wood was optimized for rake angle and feed speed. Both cutting parameters affected surface characteristics at the microscopic and macroscopic level. In turn, the interaction between rake angle and feed ...

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Effects of cutting parameters on cutting forces and surface quality of black spruce cants

[RE Hernández, AM Llavé, A Koubaa - European Journal of Wood and ..., 2014 - Springer](#)

Zusammenfassung Der Einfluss von Spanwinkel, Schnittrichtung und Schnitttiefe auf die Schnittkräfte und die Oberflächenqualität von Schwarzfichte wurden bestimmt. Gemessen wurden die Schnittkräfte beim Zerspanen bei vier Spanwinkeln (35°, 45°, 55°, und 65°), ...

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Effects of application methods and species of wood on color changes of varnishes

[M Budakci, A Ozcifici, H Cinar, A Sonmez - African Journal of Biotechnology, 2009 - ajol.info](#)

Abstract In this study, the color effects of wood materials to coloring with different application methods (brush, roller sponge and spray gun) and waterborne varnishes were investigated according to ASTM-D 2244. For this purpose, the experimental samples of Scots pine (...

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~~The influence of measuring resolution on the subsequent roughness parameters of sanded wood surfaces~~

L Gurau, H Mansfield-Williams, M Irle - *European Journal of Wood and ...*, 2013 - Springer

Zusammenfassung In der Literatur gibt es keine Empfehlung, welche Messauflösung bei der Messung von Holzoberflächen verwendet werden soll. Die in der Norm ISO 3274 (1996) angegebenen Anforderungen erscheinen zu streng. Für Holz werden aufgrund seiner ...

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Analysis of surface roughness of black alder as function of various processing parameters.

[EA Salcă, S Hizioglu - Pro Ligno, 2012 - cabdirect.org](#) 

Abstract The objective of this study was to analyse the surface quality of black alder (*Alnus glutinosa*) samples as function of sanding processes based on four grits sizes, namely 60, 80, 100 and 120. The sanding process was performed parallel, perpendicular and at 45 ...

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The effect of wood surface finishing quality on the adhesion strength of clear coat

M Ghofrani, S Khojasteh Khosro - J. Color. Sci. 2014 - jst.irancolorinstitute.com

Accepted: 11-09-2013 Available online: 11-03-2014 This study was aimed to investigate the effects of wood surface quality on adhesion strength of some clear coats. The wood samples were prepared from three species consist of walnut (*Juglans regia*), beech (*Fagus* ...

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INFLUENTA PARAMETRILOR VARIABILI AI REGIMURILOR DE PRELUCRARE ASUPRA CALITATII SUPRAFETELOR OBTINUTE PRIN FREZARE DREAPTA

A FOTIN, I CISMARU, EA SALCA, M CISMARU - proligno.ro

Lucrarea prezinta un studiu privind dependenta calitatii suprafetelor canturilor obtinute prin frezare dreapta, a lemnului de mesteacan in functie de parametrii variabili ai regimului de prelucrare. Epruvetele au fost prelucrate prin frezare cu 3 freze cu placute brazate drepte ...

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INFLUENCE OF FORWARD SPEED AND GRANULOMETRY IN THE PROCESS OF TUBULAR SANDING OF THE WOOD CORYMBIA CITRIODORA

D Zacarias, MC de Sampaio Alves, FHA Vieira... - 2013 - abcm.org.br

Abstract. As a method of surface preparation widely common in furniture industry, sanding precedes the coating process, whose function is to create uniform surfaces to evenly absorb the coating. The objective of this work is to analyze the average roughness and the ...

Articole cu conținut similar Toate cele 2 versiuni Citați Salvați Mai multe

~~THE INFLUENCE OF EARLYWOOD AND LATEWOOD UPON THE PROCESSING ROUGHNESS PARAMETERS AT SANDING~~

L GURĂU - Pro Ligno, 2014 - proligno.ro

Abstract: Sanded wood surfaces contain irregularities caused by both the sanding process and the anatomy, so the anatomical roughness, which is independent of any machining operation, must be excluded from measurements of surface irregularities if the processing ...

Articole cu conținut similar Toate cele 6 versiuni Citați Salvați Mai multe

~~ANALYSIS OF ROUGHNESS OF SANDED OAK AND BEECH SURFACES~~

L GURĂU - Pro Ligno, 2013 - proligno.ro

Abstract: Sanded wood surfaces contain irregularities caused by both the sanding process and the anatomy, so the anatomical roughness, which is independent of any machining operation, must be excluded from measurements of surface irregularities if the processing ...

Articole cu conținut similar Toate cele 6 versiuni Citați Salvați Mai multe

Research and Evaluation on the Planning and Sanding Properties of *Toona sinensis*

CW Su, QP Yuan, ZK Wang, H Chen... - *Applied Mechanics and ...* 2012 - Trans Tech Publ

Abstract: In this paper, the planning and sanding properties of *Toona sinensis*, compared with *Castanopsis hystrix*, were tested. The properties were conducted according to the criteria ASTM D1666-87. The results show as follow: in the evaluation system for full marks 5 points, the ...

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CNC ile İşlemede Ahşap Malzemenin Yüzey Kalitesini Etkileyen Faktörler

Ü KARAGÖZ - *Kastamonu Üniversitesi Orman Fakültesi ...*, 2011 - dergipark.ulakbim.gov.tr

Özet Günümüzde tasarım ve moda sektörü olan mobilya endüstrisinde yüzey kalitesi, en önemli kalite karakteristiklerinden birisi olup, ahşap malzemenin özelliklerine ve işleme parametrelerine bağlı olarak değişmektedir. CNC ile işlemede ilgili parametrelerin ...

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~~Associate Professor Scientific~~

IPL Gheorgheni - 2008 - unitbv.ro

1. GURAU, L., MANSFIELD-WILLIAMS, H. and IRLE, M., 2005. Processing Roughness of Sanded Wood Surfaces. *Holz als Roh und Werkstoff*. 63 (1) February. 2005, pp. 43-52, ISSN 0018-3768. DOI 10.1007/s00107-004-0524-8. <http://www.springerlink.com/content/0018-> ...

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木材加工面の粗さ評価

奥村正悟, 藤原裕子 - Mokuzai Gakkaishi, 2007 - jlc.jst.go.jp

木材を切削加工したときの表面の粗さは, 加工の良否や製品の品質を評価する重要な指標の一つであるため古くから研究されてきているが, 木材の加工面には加工に基づく粗さに加えて木材の細胞構造に由来する粗さが存在するため, 粗さの測定や評価はそれほど簡単ではない. ここでは, 最近 ...

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PRO LIGNO Vol. 9 N 3 2013

L DE MESTEACĂN, OFB WOOD - proligno.ro

Fotin A (2009) Contribuții la optimizarea prelucrării prin frezare și șlefuire a lemnului de mesteacăn în vederea utilizării în producția de mobilă și alte produse din lemn.(Contributions to the optimization by milling and sanding of birch wood with a view to ...

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Evaluation of Sanded Wood Surface Roughness with Anatomical Filters

S Sharif, PL Tan - tatiuc.edu.my

Abstract—Sanded wood surface is characterized not only by processing irregularities, but also anatomical irregularities that are inherent from heterogeneous wood structure. The anatomical features could distort the roughness value measured with surface profilometer ...

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Research and Evaluation on the Planning and Sanding Properties of Magnoliaceae glanca Blume Plantation Wood

CW Su, QP Yuan, Y Chen, GX Tao... - [Advanced Materials ...](#), 2012 - [Trans Tech Publ](#)

Abstract: In this paper, the planning and sanding properties of Magnoliaceae glanca Blume, compared with Castanopsis hystrix, were tested. The properties were conducted according to the criteria ASTM D1666-87. The results were shown as follow: the planning and sanding ...

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Caracterização de madeiras exóticas para acabamento com vernizes aquosos

DAL Martins - 2012 - repositorio-aberto.up.pt

Abstract The finishing is the last operation in the manufacture of a wooden object, which consists of an application of a decorative and protective coating, on the surface of the material. The primary function of any wood finish (paint, varnish or stain, for example) is to ...

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An influence of selected factors on the aspen wood surfaced roughness treated with water based coatings—Methodology work

G SLABEJOVÁ - Warsaw University of Life Sciences - annals-wuls.sggw.pl

Abstract: An influence of selected factors on the aspen wood surfaced roughness treated with water based coatings. This article discusses the influence of selected factors on surface roughness of aspen wood treated with water based coatings. Selected factors are: ...

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EVALUAREA CALITATII SUPRAFETEI LA FREZAREA PROFILATA A LEMNULUI DE ARIN SI MESTEACAN

EA SALCA, A FOTIN, I CISMARU - proligno.ro

Lucrarea prezinta un studiu comparativ asupra evaluarii calitatii suprafetelor profilate obtinute prin frezare, in cazul lemnului de arin si mesteacan, precum si influenta regimului de prelucrare asupra rugozitatii suprafetei. Epruvetele au fost prelucrate prin frezare cu ...

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Agrupamento de espécies madeireiras amazônicas para a produção de painéis de lâminas paralelas (LVL)

MRS Amorim - 2013 - repositorio.unb.br

Painéis de lâminas paralelas (LVL) são painéis estruturais com lâminas de madeira coladas paralelamente entre si com adesivos estruturais, utilizando elevandas temperaturas e pressões. Foram avaliadas propriedades das lâminas de cinco espécies amazônicas (...

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MINIMIZAREA DURATEI DE PROCESARE LA FILTRAREA SUPRAFEIELOR ȘLEFUITE DIN LEMN MASIV CU UN FILTRU GAUSS ROBUST

L Gurău, M Irle, H Mansfield-Williams - Pro Ligno, 2012 - proligno.ro

Abstract: Roughness of a processed surface has to be filtered to remove form errors and waviness. The most common filter, the Gaussian filter, introduces distortions when used on some wood surfaces, whereas the Robust Gaussian Regression Filter (RGRF) does not. ...

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Convergence of the robust Gaussian regression filter applied to sanded wood surfaces

L Gurau, H Mansfield-Williams, M Irle - Wood Science and Technology, 2014 - Springer

Abstract The quality of a sanded wood surface is represented by its roughness, which can be separated from the originally measured data by a procedure of filtering. Past experience has shown that the robust Gaussian regression filter (RGRF) is suitable for wood surfaces ...

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STUDY CONCERNING THE INFLUENCE OF MILLING PARAMETERS UPON THE SURFACE QUALITY OF THE BIRCH AND PEAR WOOD

A FOTIN, M MARTHY, I CISMARU - [afahc.ro](#)

Abstract: This paper presents a comparative study concerning the surface quality resulted after processing birch and pear wood in longitudinal direction by means of two cutters with removable plates from SMC (sintered metal carbide), with different diameters: D80 mm, ...

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Research and Evaluation on the Planning and Sanding Properties of Mytilaria laosensis

[CW Su, QP Yuan, NC Su, JD Huang - Advanced Materials ..., 2012 - Trans Tech Publ](#) 

Abstract: In this paper, the planning and sanding properties of Mytilaria laosensis, compared with Castanopsis hystrix, were tested. The properties were conducted according to the criteria ASTM D1666-87. The results show as follow: the planning and sanding properties of ...

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The feature of color alteration of bleached oak, beech, and black locust surfaces during artificial xenon radiation

C Csiha, E Papp, J Valent - [Wood Material Science & Engineering, 2013 - Taylor & Francis](#) 

Abstract In Europe, large quantities of oak wood are available and industrial partners showed interest in bleached oak as oak's reinterpretation in order to reintroduce it on the design furniture market. In the present work besides oak two further wood species beech ...

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Effect of the Cutting Speed on the Surface Quality of Black Spruce Cants Produced by a Chipper-Canter

RE Hernández, S Kuljich, O Naffeti... - [Forest Products ..., 2013 - forestprodjournals.org](#)

ABSTRACT The effect of cutting speed on surface quality of black spruce (*Picea mariana* (Mill) BSP) cants produced by a chipper-canter was evaluated. Four cutting speeds (18.9, 21.3, 24.2, and 27.1 m/s) were tested while feed speed was adjusted to obtain the same ...

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Effects of sanding parameters on sanding force and normal force in sanding wood-based panel

B Luo, L Li, H Liu, M Wang, M Xu, F Xing - [Holzforschung - degruyter.com](#)

Abstract The proper parameters of sanding with abrasive sanding machine are significant to reduce energy consumption and to improve processing efficiency and quality. The parameters sanding speed, feed speed, and granularity have been investigated in terms ...

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D Zacarias - [2012 - base.repositorio.unesp.br](#)

Neste trabalho é apresentado e avaliado o processo de lixamento tubular da espécie de *Corymbia citriodora*. O objetivo principal foi conhecer a influência e a interação das variáveis de entrada: velocidade de corte, de avanço e granulometria de lixa, sobre as ...

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K Cikanas, G Keturakis - [Mechanika, 2011](#)

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Rendeleme İşleminde Bazı Faktörlerin Toros Sediri Yüzey Pürüzlülüğüne Etkisi

C SÖĞÜTLÜ - [Gazi Üniversitesi Politeknik Dergisi, 2010 - politeknik.gazi.edu.tr](#) 

Özet Bu çalışmanın amacı, rendeleme işleminde besleme yönü, kesiş yönü ve besleme hızının Toros sediri (*Cedrus Libani* A. Rich) yüzey pürüzlülüğüne etkisinin belirlenmesidir. Bu amacı gerçekleştirmek üzere 120 adet deney örneği hazırlanmıştır. Örnekler ...

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Efecto del maquinado de albura y duramen de *Acacia melanoxylon* R. Br. en la emisión acústica, emisión de sonido y rugosidad superficial.

RAZ CRISTALES - [cybertesis.uach.cl](#)

En Chile se han plantado varias especies del género *Acacia*, las cuales se han adaptado adecuadamente a las condiciones edáficas y climáticas, exhibiendo un rápido crecimiento (Pinilla et al 2002). En particular *Acacia melanoxylon*, aroma australiano (Blackwood), ...

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[Investigation on bleaching Beech wood using environment friendly agent](#)

[C Csiha](#), [EA Papp](#) - [furnituredesign.pl](#)

Abstract: Bleaching of wood on industrial scale is mostly performed in order to eliminate defects or to satisfy sudden design demands of furniture design. Both practice and literary data are available on bleaching some wood species with H₂O₂, but no data was found on ...

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STUDY UPON THE ROUGHNESS OF STRAIGHT MILLED SURFACES MADE OF BLACK ALDER

EA SALCA, W LAURENZI, M POROJAN - researchgate.net

Abstract: The paper presents a research study upon the roughness of surfaces made of black alder wood after their longitudinal straight milling under different processing schedules. The samples were cut by using three milling cutters with glued straight plates ...

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Effets de l'angle d'attaque, de l'orientation de coupe et de la profondeur de coupe sur les efforts de coupe et la qualité de surface du bois d'épinette noire

AML Campos, AM Maîtrise - 2011 - theses.ulaval.ca

Résumé Le but du présent projet vise à déterminer les effets de l'angle d'attaque, de l'orientation de coupe et de la profondeur de coupe, sur les efforts de coupe et la qualité de surface pendant l'équarrissage du bois d'épinette noire. Pour ce faire, l'étude a ...

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FW Owusu, F Boakye, G Zorve - *Journal of Horticulture and ...*, 2015 - academicjournals.org

ABSTRACT Volumes of timber logs (dead trees) in the Volta Lake in Ghana, that had become a dead trap for water transportation, were being extracted for utilization to increase the timber resource base. Unfortunately, their properties were not known for efficient ...

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[Processing roughness of sanded beech surfaces](#)

L Gurau, C Csiha, H Mansfield-Williams - *European Journal of Wood and ...*, 2015 - Springer

Abstract This paper examines the processing roughness of beech surfaces sanded with 13 grit sizes from P60 to P600 after the separation from wood anatomy and quantifies the biasing effect of wood anatomy when it is not removed. When the anatomy was removed ...

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M Xu, L Li, B Luo, F Xing - *European Journal of Wood and Wood Products - Springer*

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Roughness of Sanded Wood Surface: an Impact of Wood Species, Grain Direction and Grit Size of Abrasive Material

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For the research the samples of ash (*Fraxinus excelsior* L.), birch (*Betula* L.), black alder (*Alnus glutinosa* L.), Scots pine (*Pinus sylvestris* L.) and spruce (*Picea abies* L.) wood were used with dimensions of (270×215×15) mm. All wood samples were tangentially planed, defect free and kiln dried. Before the research, the average moisture content, wood density, number of annual rings per 1 cm, average width of annual ring and wood surface grain direction were evaluated. Different wood surface roughness of the samples was obtained sanding wood samples in the eccentric sanding stand, using standard open-type sandpaper with different grit size. The arithmetic mean value of the single roughness depths of consecutive sampling lengths parameter R_z of the sanded wood samples were measured in five sectors along the wood grain, across and in the angle of 45°, using a contact stylus profilometer. In total 1800 measurements were done during testing series. In the research the dependence of wood surface on wood species, grain direction and grit size of abrasive material was evaluated. It was obtained that with increasing of the grit size of abrasive material, the roughness of wood surface decreases in all three measurement directions, but a linear dependence has not been established due to features of wood microstructure. In order to assess the quality of sanded wood surface accurately, it is recommended to measure the roughness of wood surface along and across the grain.

Keywords: surface roughness, sanding, grit size of abrasive material, wood grain direction.

INTRODUCTION

Wood surface roughness is substantial parameter influencing final quality of the wood products. Wood sanding quality is particularly important for the final wood processing stage of wood finishing [1]. Surface roughness impacts not only aesthetical characteristics of products, but also the adhesion, penetration and wettability of wood coatings. Surface roughness depends on wood species, anatomy, moisture content, density, porosity and machining conditions [2–5].

Surface roughness commonly is defined by surface irregularities: R_a – arithmetic average of the absolute values of the roughness profile ordinates; R_z – arithmetic mean value of the single roughness depths of consecutive sampling lengths; R_{max} – the largest single roughness depth with the evaluation length. Wood surface roughness can be measured by the means of contact and non-contact methods. The first type includes contact stylus tip, tactile sensation and pneumatic methods. One of the most popular methods is to register the profile of the surface using a stylus drawn along the surface to be measured. The diamond stylus is the main component of a profilometer. This method makes it possible to evaluate the main parameters of the surface roughness in different directions of wood grain [6–7]. The method for evaluation of wood surface roughness should be proper and chosen very accurately [8]. Gurau L. et al. compared several standard filters that are not very suitable for oak, beech and spruce surfaces due to distortions, but the Gaussian regression filter avoids these limitations and provides a

reliable method of obtaining a roughness profile for measuring wood surface [9].

Wood heat treatment influences surface roughness. The value of wood surface roughness decreases when the processing temperature is higher and the processing time is longer [10–11].

Comparing different methods of processing wood (sawn, planed, sanded) it was found that the highest surface roughness was produced by sawn wood. Planed and sanded with P60 grit sandpaper wood surface roughness was comparable. Also it was noticed, that using a finer size grit sanding paper, wood surface roughness started to decrease [3].

Comparing the surface roughness of planed Locust acacia (*Robinia pseudoacacia* L.) and European oak (*Quercus petraea* (Mattu.) Lieble.) wood, it was found that surface roughness of Locust acacia wood was lower than European oak wood [12]. Also it was determined that surface roughness decreases when the feed speed and the cutting depth decreases and increases when the number of the knives on the cutter heads decreases.

Roughness also depends on the direction of sawing – tangential or radial [5]. Research shows that radially sawn wood has a bit lower surface roughness than tangentially sawn wood. Also different surface roughness is obtained in the late and early wood areas [4]. Early wood roughness is higher than late wood.

As researches shows, many factors impacts wood surface roughness, consequently the aim of this research is to evaluate the dependence of wood surface roughness along the grain, across the grain and in the angle of 45° on wood species and grit size of abrasive material.

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MATERIALS AND METHODOLOGY

For the research different species of hardwoods and softwoods were used: ash (*Fraxinus excelsior* L.), birch (*Betula* L.), black alder (*Alnus glutinosa* L.), common Scots pine (*Pinus sylvestris* L.) and spruce (*Picea abies* L.) wood samples with dimensions of (270×215×15) mm. For one wood species and grit size of abrasive material four samples were prepared. In total 120 samples were taken. All the samples were tangentially planed, defect free and kiln dried. Samples dimensions (length×width×thickness) were measured in accuracy of ±0.01 mm. Weight of the samples was established by electronic scales in accuracy of ±0.01 g. In order to determine the grain direction the orientation of growth rings on the sample's end in relation to the sample's surface was measured using the angle ruler. Average wood density is presented in the Table 1.

Some characteristics of the studied wood samples are presented in the Table 1.

Table 1. Characteristics of wood samples

| Wood species | Average density, kg/m ³ | Number of annual rings per 1 cm | Average width of annual ring, mm | Wood surface grain direction, % |
|--------------|------------------------------------|---------------------------------|----------------------------------|--|
| Scots pine | 543 | 8.26 | 1.21 | 55.9 T ¹ 35.8 T/R ² 8.3 R ³ |
| Spruce | 480 | 8.85 | 1.15 | 54.1 T 41.6 T/R 4.3 R |
| Birch | 614 | 3.80 | 2.63 | 49.7 T 50.3 T/R |
| Black Alder | 516 | 3.60 | 2.78 | 55.6 T 44.4 T/R |
| Ash | 649 | 4.10 | 2.44 | 34.2 T 63.1 T/R 2.7 R |

¹ 6 tangential surface grain direction, ² 6 tangential/radial, ³ 6 radial.

Initially the samples were conditioned at temperature of 20°C and relative humidity of 65 % in order to reach equilibrium moisture content. Moisture content of the wood samples was 12 % ±1 % on average. After conditioning samples were sanded for 1 minute, using commercially available open-type P80, P120, P150, P180, P220 and P240 grit (according to FEPA, Type E) sandpaper. All tests were done in the eccentric sanding stand (revolution of sanding tool 6800 min⁻¹, sanding stroke 5 mm).

Surface roughness parameter R_z was measured using contact stylus profilometer (Mahr Marsurf PS1) a diamond stylus tip radius of which is equal to 2 µm and measurement angle is 90°. Five measurements sectors (12.5 mm × 12.5 mm) for each sample of wood species and grit size were selected. According to wood grain direction three measurements in each sector were done. In total 1800 measurements were performed. All measurement results were processed using a digital Gaussian filter according to DIN EN ISO 11562. Measurement error did not exceed ±10 %. Wood surface roughness parameter R_z was evaluated in three directions: along the wood grain, across and in the angle of 45°.

RESULTS AND DISCUSSION

Typical surface roughness profiles are presented in Figure 1. The results of softwood and hardwood samples surface roughness are shown in Figure 2.

Fig. 2 presents a good correlation between abrasive material and substrate surface roughness parameter R_z . For all wood species surface roughness was reduced mostly along the wood grain, while the roughness obtained across the grain and in the angle of 45° was almost similar to each other. Most of all reduced surface roughness was observed during the investigation of softwood samples. After changing the grain of sandpaper from P80 to P240, surface roughness for wood of Scots pine decreased by: 65.8 % along the wood grain, 61.5 % across the grain, and 62.1 % in the angle of 45°; for wood of spruce: 57.7 % along the grain, 58.0 % across the grain, and 58.3 % in the angle of 45°. As it is seen from Table 1 and Fig. 2, the best correlation of roughness parameters with the grit size of abrasive material was obtained while investigating the samples of spruce wood. The surface of spruce is relatively uniform due to the absence of vessels / pores [13]. It is seen from the results of research that low density, a large number of annual rings and small width of annual rings is inherent to the samples of Scots pine wood. Scots pine wood has 1.07 times less annual rings in 1 cm plot of investigated sample compared to spruce wood but the width of annual rings is 1.05 times larger in comparison with the average width of spruce wood annual rings. Such difference is also influenced by the direction of investigated wood surface grain. Tangential grain direction on the surface of spruce wood composed 54.1 % of the whole samples area, and 55.9 % in the samples of Scots pine wood. Thus, number of annual rings together with the amount of early wood increased in the case of higher percent of tangential/radial and radial wood grain. It is the explanation for 1.18 times higher surface roughness of spruce wood in all samples' groups compared to samples' groups of Scots pine wood. It is also known that softwood is resinous. Surface roughness parameter R_z is slightly influenced by the presence of resin canals in wood macrostructure.

The other samples' group was composed of hardwood. Herein the difference between the highest and the lowest values of roughness parameter R_z after changing the grit size of abrasive material from P80 to P240 decreased for birch wood: along the wood grain by 57.0 %, across the grain by 36.1 % and in the angle of 45° 6 by 39.5 %. Roughness parameter R_z of black alder wood altered by 48.5 % 6 52.9 % respectively. Proportional dependence of R_z parameter variation was not observed in the investigation of roughness of these wood species. When investigating birch wood samples, the lowest values of R_z parameter across the wood grain and in the angle of 45° were obtained after processing the received wood samples with P220 sandpaper. The latter values are 3.22 % across the wood grain and 6.66 % in the angle of 45° lower compared to those when processing the wood with P240 sandpaper. Such uneven alteration of wood surface roughness might be influenced by the quality of mechanical surface processing. The main reason is that it is difficult to distinguish the surface irregularities caused by timber processing from the roughness due to wood anatomy

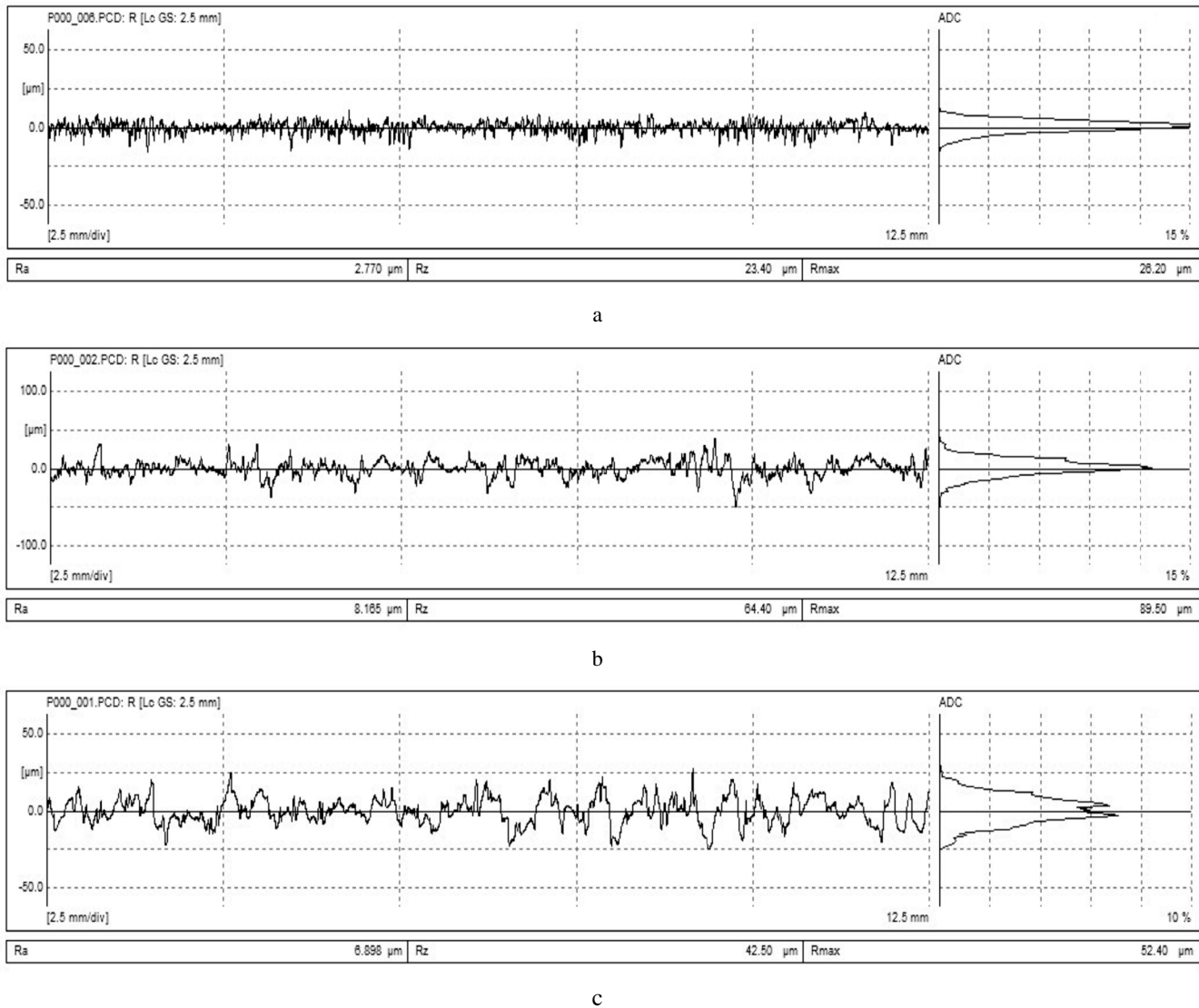


Fig. 1. Typical surface roughness R_z profiles of birch wood: a σ along the wood grain; b σ across the grain; c σ in the angle of 45°

variations [14]. Birch wood, same as black alder wood, has not got clearly expressed annual rings and is discursively porous. Ladder vessels perforation is typical for these wood species, and therefore, the values of wood surface roughness parameter R_z distribute evenly in the whole area of investigated sector (Fig. 2), resulting in similar results of wood surface roughness in all three directions. Thus average surface roughness R_z of birch wood in all measurement directions was only 1.06 times larger in comparison to average roughness of black alder samples. It was also observed during research that annual rings of black alder wood were slightly waved. Surface roughness of wood can be affected by various factors such as annual ring variation, wood density, cell structure, and late wood / early wood ratio [3]. Average width of annual rings in black alder wood samples is 2.78 mm and number of rings per 1 cm is 3.60. Meanwhile in the samples of birch wood, the width of rings was 1.06 times less and number of annual rings per 1 cm was 1.06 times larger compared to corresponding values of black alder wood samples (Table 1). Larger average surface roughness of birch wood was also influenced by wood density which was 1.19 times bigger than density of black alder wood

samples.

The largest variation of the values of wood surface roughness parameter R_z was estimated when investigating ash wood samples. In the group of ash wood samples, the largest correlation discrepancy was obtained between roughnesses of different processing groups except for research of roughness parameter R_z along the wood grain.

When investigating ash wood along the grain, the difference between the largest and the smallest roughness values was linear and composed 60.8 %. Meanwhile after analysis across the ash wood grain, the largest R_z was obtained in P120 samples group and in the angle of 45° σ in P180 samples group. Differences between the highest and the lowest roughness values composed 49.7 % across the wood grain and 46.6 % in the angle of 45° respectively when average width of annual rings was 2.44 mm and the number of rings per 1 cm was 4.10. Such uneven alteration of surface roughness is caused by vessels in wood microstructure that are set in circular rows in early wood. Wood species with large vessels in the early wood may locally cause large surface irregularities which have nothing to do with the machining process [2]. Without the deep valley removal, the surface roughness parameters

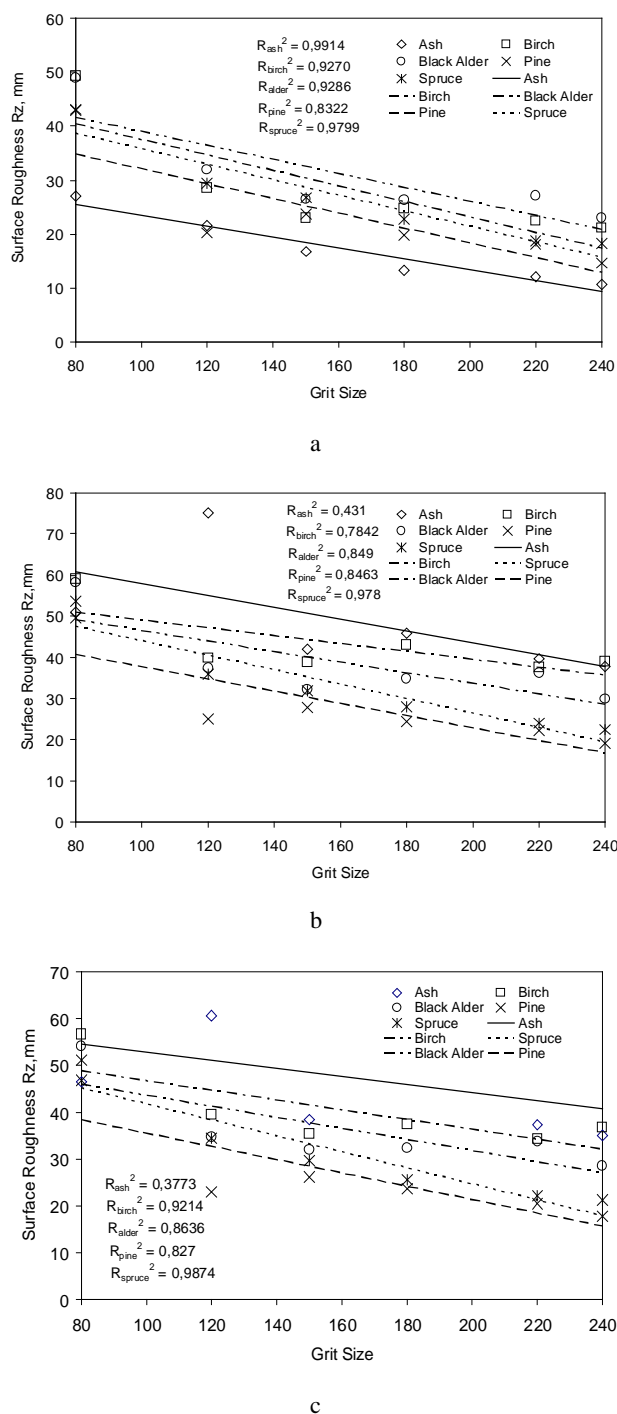


Fig. 2. Surface roughness dependence on the grit size and wood species: a \diamond along the grain; b \diamond across the grain; c \diamond in the angle of 45°

obtained do not always show a good correlation with the grit number [8]. It is also worth mentioning that tangential sawing surfaces comprised only 34.2 % of all samples when investigating ash wood samples group. Therefore, the results of wood surface roughness are different compared to those where surface roughness of other wood species was investigated in all three directions.

It was determined when comparing all five wood species that the biggest differences between the largest and the smallest R_z values in all three directions were obtained in the cases of spruce and ash wood samples, i.e. wood

surface roughness most decreased with increasing grit size of sandpaper, especially for ash wood samples along the wood grain of late wood. The best correlation of roughness parameter in all three directions when changing grit size of sandpaper was estimated in the group of spruce wood samples (Fig. 2). In this group the coefficient of variation varied from 9.19 % to 11.02 % in all three measurement directions. The samples of spruce wood had the largest number of annual rings (8.55 per 1 cm) and the smallest average width of the annual ring (1.15 mm) compared to the other wood species. Variation coefficient of the roughness parameters of the rest wood species by the grain direction was only 1.24 to 1.42 times higher, except for ash wood, where the coefficient of variation was 2.61 times higher. Such low values of determination coefficient and high values of variation coefficient can be explained by the anatomical features of ash wood.

According to wood grain direction the largest determination coefficient was determined along the wood grain. Here surface roughness dependence on the grit size and wood species was almost linear. Meanwhile the measurements, performed across the wood grain and in the angle of 45°, were less statistically reliable.

CONCLUSIONS

Wood surface roughness is directly dependent on the grit size of sandpaper, anatomic characteristics of wood species and direction of wood grain. When using a finer size grit sanding paper, wood surface roughness started to decrease in all three directions of wood grain but strict linear dependence was not estimated. After investigating five wood species, it was determined that the least surface roughness was observed when analysing the wood along the grain. Wood surface roughness in the case of across the wood grain was 1.46 times larger compared to that of along the wood grain and 1.06 times higher in comparison to wood grain in the angle of 45° respectively. The highest surface roughness was obtained when analysing wood samples in P80 samples group and the lowest was found in P240 samples group. The difference between the highest and the lowest values was equal to 1.97 times. The best dependence of roughness parameter R_z from wood grain direction and grit size of abrasive material was obtained when investigating spruce wood samples. While investigating the roughness of ash wood samples additional studies of parameters should be established in order to eliminate the distortions of wood roughness due to large vessels in the measurement way. In order to evaluate the surface roughness effectively, it is recommended to perform the measurements not only along, but and across the wood grain.

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